

BeAGLE Debugging

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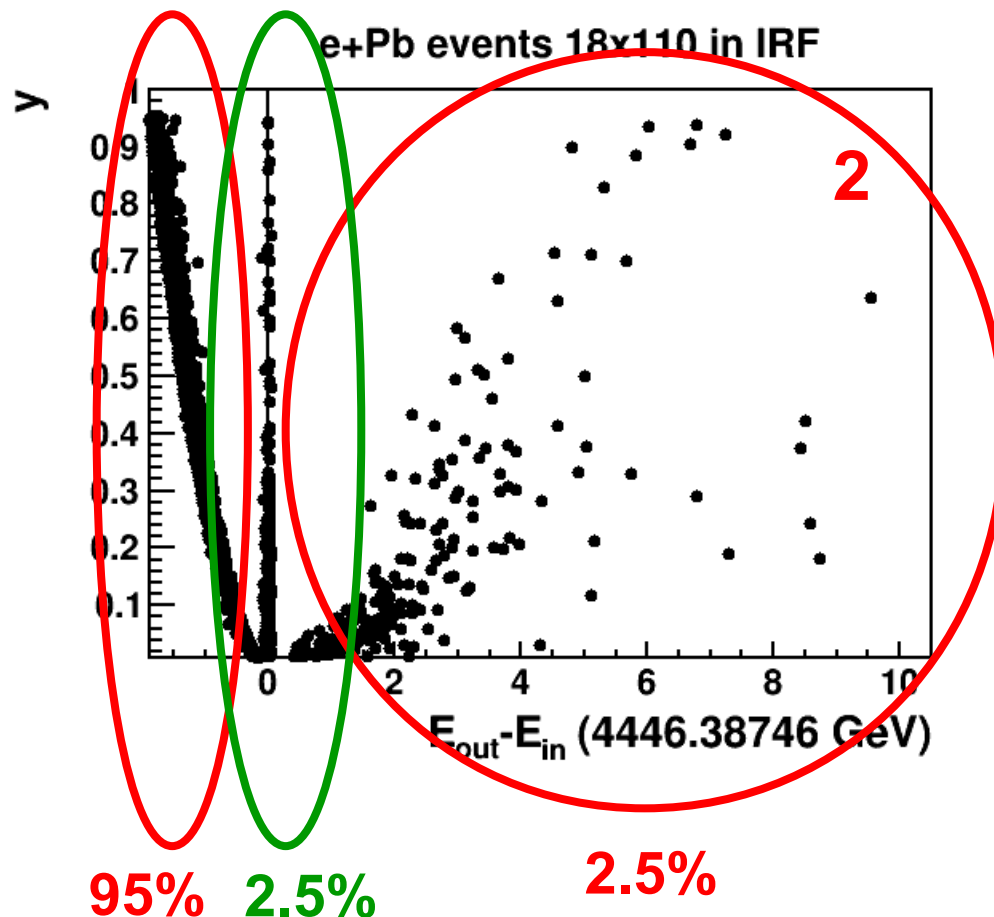
July 3, 2019

Energy (& charge) nonconservation!

Discovered with Kong almost 1 year ago (August)!

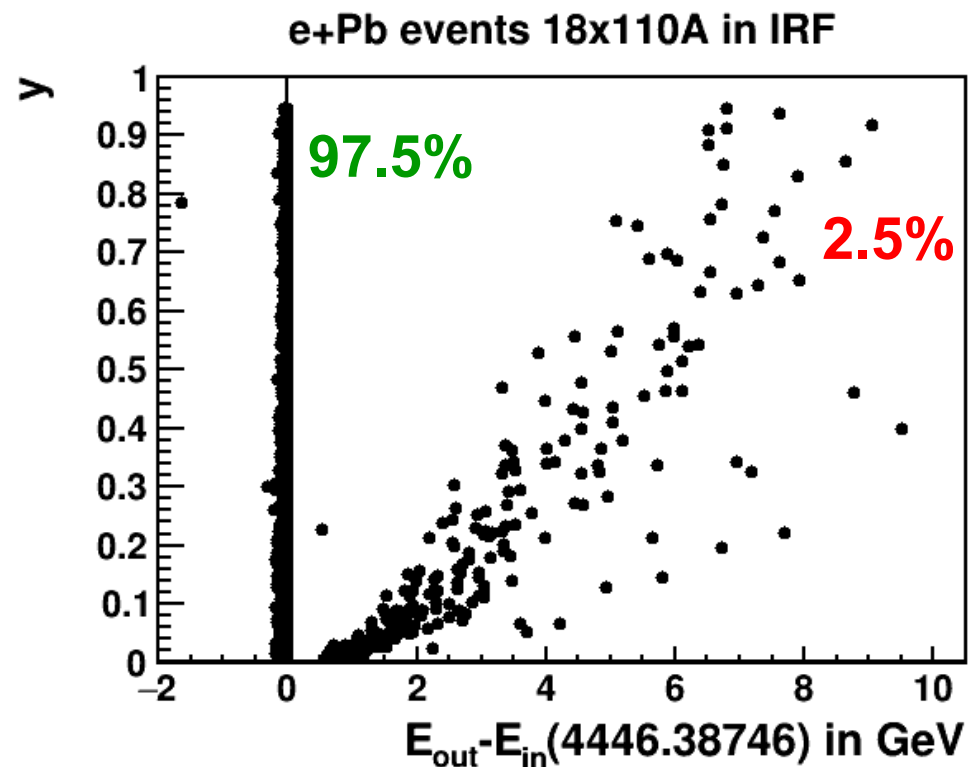
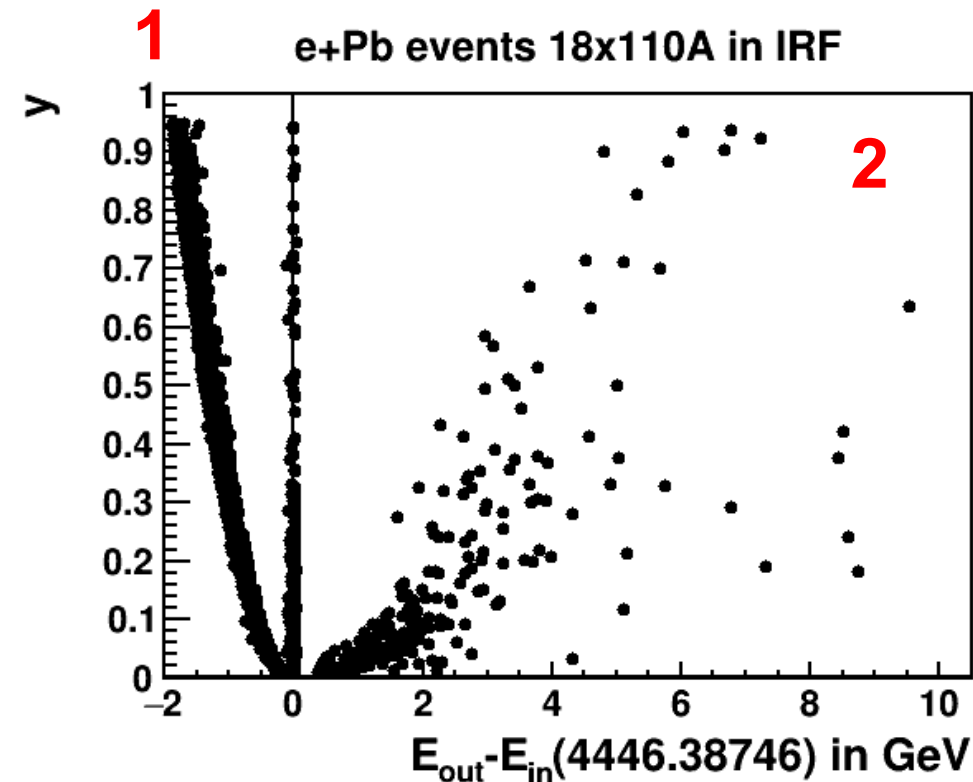
The problem(s) in order of frequency

1 $E_{\text{out}} - E_{\text{in}}$ should be zero



Main bug (1) fixed

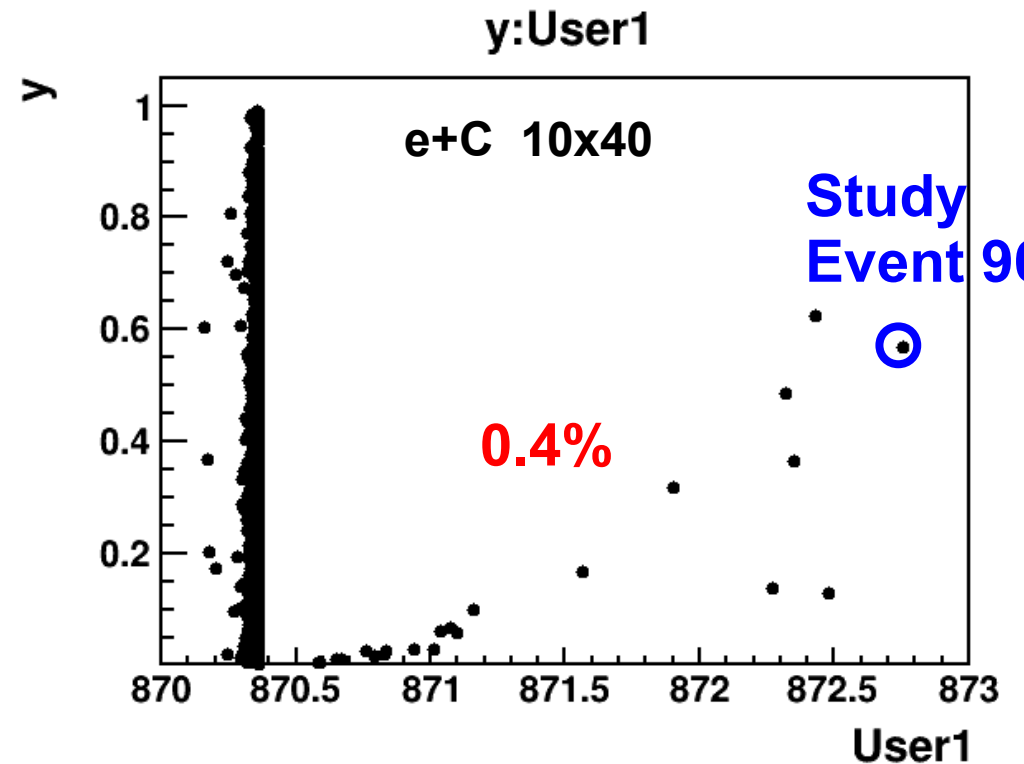
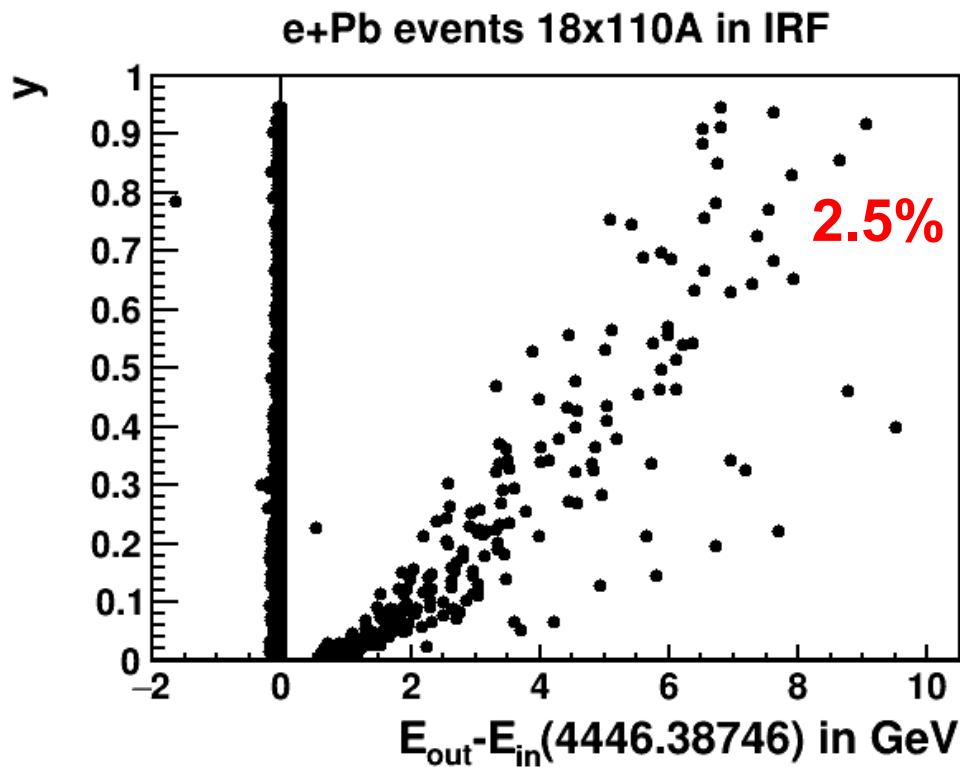
DPMJET-F had a small strange block of code which recalculated and rescaled the 3-momentum of the excited remnant incorrectly. It was fine to start with! This confused FLUKA – inconsistent input. **REMOVED.**



Switch to e+C for easier debugging

The bug seems related to intranuclear cascade (but not every one).
Fewer bad events in e+C, but much simpler events: $A=12$ vs. 197.

Ev. 96: The energy error in IRF is >2 GeV, but in lab <200 MeV ($/490$ GeV)



Wan's proton detection plots are important

- Existing plots look good.
- Do we have a drawing with the Vacuum System in it?

What can we finish technically?

Feature added or error corrected	01/2019	06/2019	07/2019(proj.)
1-8,10,13-17,20-22. Completed BeAGLE tasks.	YES	YES	YES
9. Shadowing coherence length	NO	NO	NO
11a. Effective σ_{dipole} for J/ψ averaged over x & Q^2	YES	YES	YES
11b. Effective σ_{dipole} for ϕ averaged over x & Q^2	YES	YES	YES
11c. Eff. $\sigma_{\text{dipole}}(x, Q^2)$ for $V=\psi, \phi, \rho, \omega$ from Sartre (ePb)	NO	NO	NO
11d. Use correct $R_{\text{diff}}^{(A=208)}(x, Q^2)$ for V from Sartre	NO	NO	NO
11e. Improved σ_{dipole} for V , if necessary	NO	NO	NO
12a. Understand E665 Event Trigger (& Q^2 dist.)	NO	Started	????
12b-?. Tune to E665 μA Streamer Chamber data	NO	NO	NO
18. Tune the t distribution for multiple scattering.	NO	NO	NO
19a. Release α version BeAGLE/RAPGAP	YES	YES	YES
19b. Release β version BeAGLE/RAPGAP	YES	YES	YES
19c. Fix charge non-conservation bug (DPMJET-F)	NO	YES	YES
19d. Fix lost energy bug (DPMJET-F)	NO	YES	YES
19e. Fix excess energy bug (DPMJET-F?)	NO	NO	YES
19f. Release tested version BeAGLE/RAPGAP	NO	NO	????
19g. Extend RAPGAP to include e+n (w/ H. Jung)	NO	NO	NO
22a. Update relative nucleon mom. dists. for e+D	YES	YES	YES
22b. Variety of well-motivated distributions for e+D	NO	NO	YES
23a. Put e+D on mass-shell (ad-hoc)	YES	YES	YES
23b. Put e+D on mass-shell, light-cone prescription	NO	NO	NO
24. Fix J/ψ & ϕ to decay outside the nucleus	NO	YES	YES

Progress, in any case.

Hope to succeed on bug!
Not RAPGAP yet.

Updated plot from Kong?

Conclusion

- Still lots to do, but we have made good progress.
- I'll try to have a talk draft early next week. My talk is on Thursday.